

**CLAIMS**

1. A compressor designed to be lowered into a well of a natural gas reservoir to assist in extracting gas from the  
5 reservoir, the compressor comprising:

a casing,

a rotor mounted within the casing,

an electric motor for driving the rotor having a stator with windings stationarily mounted in the casing and an  
10 armature formed as part of the rotor, and

gas bearings supporting the rotor for rotation relative to the stator, the gas bearing being arranged at the upstream and downstream opposite ends of the motor,

characterised in that

15 a bladed impeller wheel for compressing the production gas from the reservoir is mounted on an overhanging end of the rotor that projects beyond the gas bearing at one end of the motor, such that all the gas bearings of the compressor and of the electric motor are arranged on the same side of  
20 the bladed impeller wheel, and

during operation, the production gas flows over and serves to cool the electric motor.

2. A compressor as claimed in claim 1, wherein the  
25 rotor of the compressor that incorporates the armature of the motor is formed hollow to assist in cooling of the motor.

3. A compressor as claimed in claim 1, wherein the  
30 bladed impeller wheel is arranged at the upstream end of the rotor and wherein an auxiliary compressor is mounted on the opposite end of the rotor, the auxiliary compressor drawing gas from downstream of the main compressor and serving to supply the gas after further pressurisation to the bearings  
35 of the rotor.

4. A compressor as claimed in claim 3, wherein both compressors are overhung, all the bearings being situated axially between the main and auxiliary compressors.

5 5. A compressor as claimed in claim 3 or 4, wherein the auxiliary compressor is also an axial compressor.

6. A compressor as claimed in claim 3 or 4, wherein the auxiliary compressor is a centrifugal compressor.

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7. A compressor as claimed in any of claims 3 to 6, wherein a purifier is provided in the intake of the auxiliary compressor.

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8. A compressor as claimed in any of claims 3 to 7, wherein gas pressurised by the auxiliary compressor is discharged into the axial flow of produced gas after passing through the bearings.

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9. A compressor as claimed in any of claims 3 to 7, wherein means are provided for transferring heat from the gas discharged from the bearings to the axial flow of produced gas and for recycling the cooled gas to the intake of the auxiliary compressor, whereby the gas supply to the

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10. A compressor system for a gas well that comprises two or more compressors as claimed in any preceding claim, arranged in tandem with one another.

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11. A compressor system as claimed in claim 10, comprising a plurality of compressor or sets of compressors arranged in tandem position at different heights along the bore hole of the well.

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